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EPA

April 13, 1992

Allan C. Harris
Unit Manager
U.S. Department of Energy
P.O. Box 550, A5-19
Richland, Washington 99352

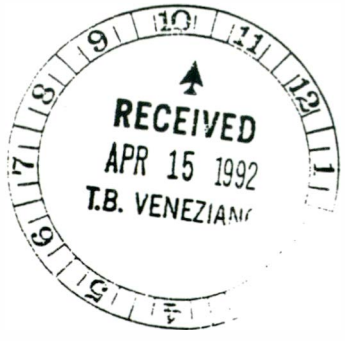
Re: Review of Z Plant Source Aggregate Area Management Study Report dated February 1992

Dear Mr. Harris:

Enclosed are the comments from the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), and their contractors on the Z Plant Source Aggregate Area Management Study Report (AAMS).

In general, the report is well written and thoroughly addresses the scope of the Z Plant AAMS. However, the report weakens in regards to the transport pathway conceptual model. The report simply repeats data reported earlier instead of interpreting the data and drawing conclusions on the waste site transport potential.

The criteria and rational for the recommendations presented in chapter nine need to be further developed. A more thorough analysis of the data would perhaps provide better support for the recommendations. At this time, EPA is not prepared to make a decision on the recommendation to remove the groundwater investigation from the scope of Z Plant Operable Unit Work Plans. Instead we prefer to make a decision after the 200 West Groundwater AAMS is published. Although 200-ZP-1 is one of six scheduled work plans to be produced in 1993, EPA does not expect



delaying this decision will impact DOE's commitment to produce six operable unit work plans. Other recommendations presented in chapter nine are addressed in specific comments.

If you have any questions or concerns, feel free to contact me at (509) 376-8631.

Sincerely,

Dennis Faulk
Unit Manager

Enclosure

cc: D. Goswami, Ecology
G. Hofer, EPA
T. Veneziano, WHC
D. Lacombe, PRC
W. Staubitz, USGS
Administrative File (200 Area AAMS)

Specific Comments for Z Plant AAMS

1. Section 1.2.2, page 1-6, third paragraph

To make appendix D consistent with the 100 area work plans the term "Data Management Plan" should be changed to "Information Management Overview".

2. Section 2.1, page 2-1, second paragraph, lines 38 and 39

The text refers to Figure 2-13 for unplanned release locations. However, Figure 2-13 does not indicate the unplanned releases discussed in the text. It appears that the text and figure nomenclatures are different. The text nomenclature should be corrected to correspond to Figure 2-13.

Additionally, the text discusses the location of buildings and waste management units, but the figure referred to does not have a number. The correct figure number should be provided.

3. Section 2.2, page 2-3, first paragraph

The text refers to Figure 2-1 for the Z Plant aggregate area process timeline. However, Figure 2-1 shows the operational history of waste management units. This discrepancy should be clarified.

4. Section 2.2, page 2-3, 4th paragraph

The text mentions that an explosion occurred in the 242-Z Building leading to it's shutdown. However, no mention is made of any releases from the facility during the explosion. If available, this information should be included.

5. Section 2.3, page 2-4, lines 4 to 20

The text provides definitions of high-level, transuranic, and low-level wastes. A table showing the specific sources, facilities, and processes which generated these waste streams should be provided. Also, an explanation of methods by which waste streams are classified as high-level, transuranic, and low-level should be included.

6. Section 2.3, page 2-5, third paragraph, lines 23 to 31

A reference should be cited for the various engineering measures developed to reduce the overall volume of wastes generated in the Z Plant aggregate area. The text should also state whether the volume reduction measures are implemented.

The specific sources or facilities which discharged nonprocess wastewater (e.g., noncontact cooling water) should be stated.

The rationale for inclusion of the 216-Z-20 Crib as part of the U Plant AAMS report should be provided.

7. Section 2.3.1, page 2-6, first paragraph, lines 6 to 14

The facility description for Z-Plant is incorrect. The entire facility is called the PFP. It consists of the 234-5Z building which houses the RMC line, the PFP Engineering Laboratory, and the Plutonium Process Support Laboratory, the 236-Z Building, 242 Building, etc...
In addition, the 231-Z building is not an inactive facility. It contains offices, carpenter shop, and a sign painters shop. 231-Z also contains a number of laboratories that are used from time to time. This section should be corrected.

8. Section 2.3.1.1, page 2-7, line 6

The rationale for inclusion of the 216-Z-19 Ditch in the U Plant AAMS should be stated.

9. Section 2.3.1.1, page 2-7, fourth paragraph, lines 12 to 15

The text should explain whether the 80 potential contributors are process or nonprocess waste streams or both. A reference section should be cited from the U Plant AAMS report for the 80 potential contributors including the sources, facilities, and processes for these 80 contributors.

10. Section 2.3.1.2, page 2-8, line 10

See comment 7 in regards to 231-Z.

11. Section 2.3.1.3, page 2-8, line 20

This section refers to the 236-Z Building in the past tense but in fact this is still an active facility. This discrepancy should be corrected.

12. Section 2.3.1.4, pages 2-8 and 2-9

The text states that the 242-Z Building was used from 1964 to 1976 to recover americium from the PFP process line. But, the waste stream from this building was discharged through the 216-Z-1A Tile Field and the 216-Z-18 Crib between 1949 and 1959 and between 1964 and 1973. There is no information regarding the discharge of waste stream for the period 1959 to 1964. The year that operation stopped at the 242-Z Building is incorrectly reported in the second paragraph. No discussion is provided about the 242-T Evaporator; the text does not indicate whether it is a waste management unit in Z Plant Aggregate Area. These discrepancies should be resolved.

13. Section 2.3.1.5, page 2-9, lines 12 to 20

This section needs to be rewritten to clarify the components of the 241-Z facility. The 241-Z facility is used to temporarily store and treat process effluents from PFP. It consists of 5 4,200 gallon below grade tanks housed in concrete sumps. Of the 5 tanks one of them, the D-6 tank was declared not fit for use and has been deactivated. In addition, the 241-Z facility contains 2 above grade tanks, D-10 and D-11 that are used to mix chemical additives for the D-5 tank.

14. Section 2.3.1.6.1, page 2-9, lines 27 and 28

This section states that the duration of activity for the 232-Z Incinerator was from 1961 to 1973. However, Table 2-1, page 2-T-1a lists this duration beginning in 1959. The correct year should be referred to throughout the text.

15. Section 2.3.1.6.2, page 2-10, line 12

This section lists some of the common wastes handled at the HWSA. In particular it list benzenes, I believe that PFP handles very little benzenes and perhaps this should be deleted from the text. In addition, many PCB articles are handled at the pad and should be noted here.

16. Section 2.3.1.6.3, page 2-10, line 19

The text refers to an incorrect table number for the volume of waste handled by the Radioactive Mixed Waste Storage Facility (RMWSF). Table 2-1 should be substituted for Table 2-2 in line 19.

A list of generators and facilities that shipped the mixed waste to RMWSF should be included. Information about the mixed waste should also be provided (whether it is solid or liquid, the amount of waste stored including the number of drums or approximate quantity, and the method of handling).

17. Section 2.3.1.6.5, page 2-11, lines 1-4

This section refers to the 2736-ZB Building in the past tense but in fact the building is still active. This discrepancy should be corrected.

The next paragraph states that routine effluents from the building consist of waste water from the HVAC system, however, the next sentence states that there are no potential contributors to the effluent stream. These sentences appear to contradict each other.

18. Section 2.3.2.1, page 2-12, second paragraph, lines 9 to 11

The information on the liquid waste volume and the plutonium content of the 216-Z-8 Settling Tank does not match with the values in Tables 2-1 and 2-2. For example, the plutonium content of the tank is reported as 1,600 grams (gm) in this section whereas it is reported as 48 gm in Table 2-2. Similarly, the total waste (liquid plus sludge) contained in the tank is estimated at 30,970 liters versus the value of 10,000 liters in Table 2-1. This inconsistency should be addressed and the text changed where appropriate.

19. Section 2.3.2.3, page 2-12

The text states, "currently PFP wastes are routed to tank 102-SY". But, Figure 2-14 indicates that the operations at PFP ceased in 1983. This discrepancy should be clarified.

20. Section 2.3.3, page 2-13, second paragraph

Several of the waste management units have been given several names over the years. It would be helpful if a table listing the units and their alias's could be included.

21. Section 2.3.3.2, page 2-14, line 31

The location and operational history of the 207-Z-361 Settling Tank should be provided.

22. Section 2.3.3.5, page 2-15, line 41

The value reported in the text is not consistent with the value presented in Table 2-1 for the total volume of waste received at the 216-Z-7 Crib. This discrepancy should be corrected.

23. Section 2.3.5.2, page 2-22, line 26

This sentence states that trace amounts of plutonium was discharged to the 216-Z-9 trench. Later the document states that the soil was removed in certain instances to prevent a criticality at the Z-9 trench. Therefore, to state trace amounts of Pu was discharged is inappropriate and should corrected. Also, no mention of the final disposition of this material is made. If the information is not classified it should be provided.

24. Section 2.3.9.4, page 2-30, line 36

This sentence states that no waste buried since 1980 contains hazardous waste. A more appropriate statement to make would be that no records indicate that hazardous waste has been deposited in these waste units after 1980.

25. Section 2.3.10, page 2-36, sixth paragraph

The text indicates that there were 21 unplanned releases however, figure 2-13 lists 23 releases. This discrepancy should be corrected.

26. Section 2.4.2, page 2-38, lines 29 to 42

This whole section refers to PFP in the past tense. Since it is still an active facility the adverbs should be changed.

The date that the RMC line operated is incorrect. The facility operated until 1989 not 1973.

27. Section 2.4.2.2, page 2-39, line 10

The title of this section is PFP Waste Streams but the text refers only to liquid waste streams. The word liquid should be added to the title.

28. Section 2.4.2.2.2, page 2-40, second paragraph, lines 12 to 27

This section lists chemicals detected in the Plutonium Finishing Plant wastewater stream. The chemicals listed in this section include metals, beta particles, total organic carbon (TOC), total organic halogens (TOX) (as Cl^-), and total dissolved solids. Table 2-6, page 2T-6 also lists chemicals of concern for this wastestream and does not list all of the detected chemicals in the table. This table should be completed to reflect the detected chemicals.

29. Table 2-8, page 2T-8a to 8c

This table lists the chemicals used in Z-Plant laboratories. The table list approximately 75 chemicals but the SARA section 312 report lists many more than the 75. Either all the laboratory chemicals should be listed or the title of the table should be changed to partial list of chemicals used at Z-Plant labs.

30. Section 3.0

The text references Tables 3-1 through 3-4. These tables are not included in the report or the table of contents.

31. Section 3.3.1, page 3-4, line 27

It is noted that surface drainage from the Horse Heaven Basin enters the Pasco Basin. As shown in Figure 3-7, the Horse Heaven Basin does not drain into the Pasco Basin.

32. Section 3.5.2.1.3, page 3-26, lines 21-30

The term "confined" is not appropriate since there is evidence of direct communication between unit A and unit E as shown in figure 3-17. The term "semi-confined" seems to be a more appropriate name for the unit A aquifer. Also the text refers to the groundwater instead of the aquifer in many areas of the text. The correct term for this section is aquifer.

33. Section 3.5.2.4, page 3-30, lines 14 and 15

It is noted that the horizontal hydraulic gradient is expected to <u>increase</u> as the 200 West mound continues to dissipate. The gradient should actually <u>decrease.</u>

34. Section 3.5.3.1.1, page 3-31, line 35

Moisture content is described in terms of volume in the text in Section 3.5.2.1.1 and in Figures 3-40 and 3-41, but as moisture content by weight percent in the table on page 3-31. Units should be consistent in the report for comparison. We suggest converting the moisture contents listed by weight percent on page 3-31 to a volume percent if the data are available for this data set.

35. Sections 3.6.1.1 to 3.6.1.4, pages 3-34 to 3-39

Several scientific names within the text are misspelled or archaic. The text should be revised to include current scientific names with accurate spelling.

36. Section 3.6.1.1, page 3-34, first paragraph, line 29

The text includes the statement, "The vegetation of the 200 Areas Plateau is characterized by native shrub steppe interspersed with large areas of disturbed ground with a dominant annual grass component." The word steppe should be removed, as it is indicative of a biome not a vegetative type.

37. Section 3.6.1.2, pages 3-35 and 3-36

Scientific names of all species should be included in this section.

38. Section 4.1, page 4-3

The background levels used to compare the results of external radiation or dosimeter readings at a site should be specified. Similarly the background levels used to compare the gamma radiation readings in boreholes should be stated. The base line reading used to determine whether the gamma radiation values exceeded the base line value for groundwater impact should be specified.

39. Section 4.1.1.2.1, page 4-7, line 28

It is not clear why it is "nearly impossible" to convert gross gamma counts to a meaningful exposure rate due to the complex distribution of radionuclides on the site. It would be more meaningful to attempt to make sense of the data with its limitations, rather than explaining what information the data does not give us.

40. Section 4.1.2.1.2, page 4-18, lines 23 and 24

This section states that "no releases were reported at the 234-5Z HWSA." Table 2-3, page 2T-3a indicates the 234-5Z HWSA was contaminated with carbon tetrachloride, nitrate, and sodium hydroxide. This discrepancy should be resolved.

41. Section 4.1.2.4, page 4-24, line 25

This section states, "No specific chemical sampling data was identified for the 216-Z-10 Reverse Well." Table 2-3, page 2T-3b indicates detection of nitrate and sodium at that location. This discrepancy should be resolved.

42. Section 4.1.2.7 page 4-26, lines 18 to 20

This sentence is unclear and has either missing or repeated text.

43. Section 4.2, page 4-32

The title of this section should reflect potential impacts to the environment. The discussion provided for the conceptual model only presents human exposure concerns. The text should also discuss ecological pathways and concerns.

44. Section 4.2.1, page 4-33, lines 11 to 13

This section states that potential for dry waste to migrate to soils outside of the waste management unit is low due to the negligible natural recharge rate at the Hanford Site. This statement contradicts with Section 3.5.1, page 3-20, line 39 which concludes "downward water movement below the root zone is common in the 300 Area, where soils are coarse-textured and precipitation was above normal." The first statement should be revised to indicate areas where the natural recharge rates are negligible.

45. Section 4.2.2, page 4-34, first paragraph, lines 1 to 20

Transport pathways for the Z Plant Aggregate Area are summarized in this section. Ingestion of soil and direct contact with nonradionuclides, and uptake from contaminated biota through the food chain should also be presented.

46. Section 4.2.2.1.2, page 4-35, first paragraph

The first paragraph notes that recharge from precipitation in the 200 Areas may range between 0-10 cm/yr depending on the soil type and surface cover. No mention is made as to what range of soil types and surface covers overlie the waste units in the Z plant area, nor what is the best estimate of recharge for various types of waste units in Z plant. It is our understanding that the surfaces of waste units are generally kept clear of vegetation and are often times covered with gravel. If this is true at Z plant, it should be noted that recharge likely is near the higher end of the 0-10 cm/yr range.

This section largely repeats information provided in Section 3.5.2.2. As a description of the conceptual model, this section should provide an interpretation and draw preliminary conclusions based on the data provided in previous sections, not simply rehash available data or general concepts.

47. Section 4.2.2.1.5, page 4-37, first paragraph

Carbon tetrachloride was discharged in large volumes to the vadose-zone in the Z plant area. Does carbon tet complex with inorganic ions, and will this complexation affect the retardation of contaminant migration?

48. Section 4.2.4, pages 4-42 and 4-43

Contaminants of potential concern are discussed in this section. The criteria for selecting those contaminants are presented. However, the rationale or reference for using one of the criteria is not presented (second bullet), and contaminants appear to be inappropriately eliminated by the use of one of the screening criteria (third bullet). These criteria are discussed below.

The second bullet indicates that buildup of short-lived daughter radionuclide activity to a level of 1 percent or greater of the parent radionuclide activity causes the daughter to be included on the contaminant of concern list. However, the rationale or reference for this criterion is not included, but should be. If the parent activity is extremely high, 1 percent may not be a conservative screening level.

The third bullet indicates that contaminants were placed on the contaminant of concern list if they are known or suspected carcinogens or have an EPA noncarcinogenic toxicity factor. It appears that contaminants not meeting

such criteria are eliminated from the contaminant list. This screening fails to following the contaminant screening process outlined in the DOE (1991) methodology. The risk assessment methodology for the Hanford Site should be discussed and referenced in this section, and the third bullet should be deleted.

49. Section 4.2.4.5.1, page 4-49, first paragraph, lines 36 to 39

The text states genetic and teratogenic effects generally occur at higher exposure levels than those required to induce cancer. The reference supporting this statement should be included.

50. Section 4.2.4.5.1, page 4-50, third paragraph, lines 18 to 21

The text states DOE (1991) proposes to use the dose conversion factors developed by the International Commission on Radiological Protection (ICRP) to calculate risk values when EPA slope factors are not available. The final risk assessment methodology for the Hanford Site states that if a slope factor is not available, the EPA Office of Radiation Programs will be consulted and requested to develop the required slope factor.

51. Section 4.2.4.5.1, page 4-50, fourth paragraph, line 26

The text discusses the various parameters used to develop unit risk factors. The text refers to the length of time a nuclide is retained in the <u>lungs,</u> but should refer to the length of time a nuclide is retained in an <u>organ of interest.</u>

52. Section 4.2.4.5.1, page 4-50, last paragraph, lines 37 to 39

The text states that EPA risk assessment guidance assumes exposure to multiple carcinogens results in effects that are additive without regard to target organ or cancer mechanism. The text should distinguish between radionuclide and nonradionuclide additivity. That is, risks from multiple radionuclides can be added together, and risks from nonradionuclides can be added together. However, risks from radionuclides and nonradionuclides cannot be added together because of differing assumptions in the respective exposure assessment equations.

53. Table 4-19, page 4T-19a

The third page of the table is missing.

54. Table 4-20, page 4T-20a

This table appears to provide only human health effects; the title of the table should reflect this. The table indicates the Integrated Risk Information System and the Registry of Toxic Effects of Chemical System (RTECS) were used for locating toxicity information. RTECS is not commonly used in a toxicity assessment. Chapter 7, Section 7.4 in EPA (1989a) provides a list of resources that should be used for locating toxicological information. RTECS can be used, but only after resources in the EPA (1989a) document have been exhausted. In addition, a column should be included that provides the reference for each piece of data.

55. Section 5.1, page 5-2

The title of this section, Conceptual Framework for Risk-based Screening, is misleading. The reader expects to find information on risk assessment screening procedures as outlined in EPA (1989a,1991) guidance. What is presented is a discussion on general exposure pathways and an occupational exposure scenario. It is more appropriate to entitle this section "Conceptual Framework for the Occupational Scenario."

56. Section 5.3, pages 5-7, line 33

The text refers to criteria used in the HRS scoring. Certain criteria have changed since the finalization of the HRS on December 14, 1990, and the text should note scoring was done using the old system.

57. Section 5.3, pages 5-7 and 5-8, second paragraph, lines 38 to 42 and lines 1 and 2

The text states the following:

> The HRS ranking system evaluates sites based on their relative risk, taking into account the population at risk, the hazard potential of the substance at the facility, the potential for contamination of the environment, the potential risk of fire and explosion, and the potential for injury associated with humans or

animals that come into contact with the waste management unit inventory.

The term "hazard potential" should be more accurately described as "hazardous waste constituent toxicity and quantity." The phrase "potential for injury" should be more accurately stated as "potential for exposure."

58. Section 5.3, page 5-8, first paragraph, lines 11 to 13

The text states that, "the mHRS takes into account concentration, half-life, and other chemical specific parameters that are not considered by the HRS." The present HRS does take these factors into account. The text should clarify that the previous HRS did not consider those factors.

59. Section 6.2.1.3, page 6-4, second paragraph, lines 13 to 15

The paragraph states that Resource Conservation and Recovery Act (RCRA) permitting requirements would only apply to a waste management unit that is an identified hazardous waste treatment, storage, and disposal (TSD) facility and where hazardous waste activities occurred outside an area of contamination. The language in this sentence is confusing, and the main point of the paragraph is muddled.

A hazardous waste management unit is not a RCRA TSD facility. A hazardous waste management unit usually occurs at a TSD facility. The point of the paragraph seems to be that management of RCRA hazardous waste in a manner that ordinarily requires a permit does not require a permit at a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site. CERCLA Section 121(d) and 121(e) respectively require that CERCLA activities comply with all substantive appropriate or relevant and applicable requirements but not administrative requirements such as permitting. This paragraph should be amended to state that hazardous waste activities conducted on site at a CERCLA site are subject to the substantive requirements of RCRA but not the administrative requirements such as permitting.

60. Section 6.2.1.3, page 6-4, fifth paragraph, lines 38 to 42

The text states that land disposal restrictions can be used to determine if cleanup wastes can be left in place (i.e., land disposed). This sentence is unclear. If a waste is left in place, then it is not subject to the land disposal restrictions. However, if the waste has been excavated, it

would be subject to land disposal restrictions if the ultimate intent is to dispose of it on the land. This sentence should be rewritten to clarify the intent of the section.

61. Section 6.2.2.3, page 6-7

This paragraph describes the intent of the referenced state regulations but does not state whether or not it is a potential applicable or relevant and appropriate requirement (ARAR) for this site. The text should state whether this regulation is a potential ARAR for this site.

62. Section 6.2.2.4, page 6-7

This paragraph describes the intent of the referenced state regulations but does not state whether or not it is a potential ARAR for this site. The text should state whether this regulation is a potential ARAR for this site.

63. Section 6.4.1.2, page 6-12, second paragraph, lines 10 to 25

This section discusses the applicability of the land disposal restrictions to specific actions undertaken at this site. It may be more clear that the land disposal restrictions are ARARs if some of this section is mentioned earlier in the text in Section 6.2.1.3. The details are appropriate in the existing section; however, earlier clarification would be helpful. Insert sections of this paragraph into Section 6.2.1.3.

64. Table 6-1, page 6T-1a

Under the RCRA Land Ban-CCW and MTCA Method A Cleanup Levels columns, Table 6-1 cites the concentration for chromium. The table lists concentrations for chromium (VI) and (III); however, the concentrations listed in RCRA and the Model Toxics Control Act (MTCA) are for total chromium. A line for total chromium should be added to this table, and the values identified in RCRA and MTCA should be listed here.

For some of the chemicals of concern such as boron, zinc, nitrate, and nitrite, no cleanup criteria are listed. The cleanup levels for these contaminants should be specified.

65. Section 7.1, page 7-3, third paragraph, lines 19 to 34

The text discusses the media of concern for the Z Plant Aggregate Area. The text should also discuss direct exposure to soils contaminated with nonradionuclides and inhalation of particulates.

66. Section 7.2, page 7-5, first paragraph

The preliminary disposal alternatives for the excavated soil and material on a small-or large-scale basis should be clearly identified and described.

67. Section 7.2, page 7-5, second paragraph, line 17

The text in this paragraph is not consistent with the text in Tables 7-2 and 7-3 for waste treatment. For example, biological land farming, and dechlorination are considered treatment options in this paragraph but not included in Tables 7-2 and 7-3.

68. Section 7.2, page 7-5, third paragraph

Waste containment should also include vertical and horizontal barriers technologies in addition to capping technology.

69. Section 7.3, page 7-7, fifth paragraph, lines 25 and 26

Treatment technologies are proposed for biota. The source for the biota contamination is soil. If the soil is remediated, the source for the biota contamination would be removed. Hence, the biota-specific technologies are not necessary and should be deleted exclusively for the Z Plant waste management units.

70. Section 7.4, page 7-7

Since semivolatile organic compounds are also candidate chemicals of potential concern for the Z Plant aggregate area (Table 4-13), remedial alternatives applicable to disposal sites that contain semivolatile organic compounds should also be developed.

71. Section 7.4.1, page 7-8

Technologies with process options proven effective at industrial waste sites and also pertinent technologies being developed should be specified.

72. Section 7.4.1, page 7-8, first paragraph, lines 18 and 19

A reference for EPA guidance on feasibility studies for uncontrolled waste management units is not listed in Section 10.0 and should be included.

73. Section 7.4.1, page 7-9, second paragraph, lines 19 to 41

The remedial action alternatives summarized in this section should list the process options retained from Table 7-3 for development of alternatives under each alternative.

74. Section 7.4.2, page 7-11, lines 1 to 11

Disadvantages to the capping vertical barriers alternative should be included. Capping does not eliminate the source of radioactivity, which further limits use of the site. The cap must be maintained as long as contaminants exist at the site without penetration, indefinitely. If barrier walls are not used, horizontal and vertical migration of contaminants could still occur. Another potential disadvantage is the possible deteriorations of the barrier walls resulting from the chemicals contained in the waste, particularly organic chemicals.

75. Section 7.4.3, page 7-11

The text in this section states that in-situ grouting or stabilization of soil would reduce the leachability of volatile organic compounds. Section 7.4.1 states that volatile organic compounds are not easily treated by in-situ stabilization. Alternate 2 should also provide a combination of immobilization and containment for organic compounds. The text should be consistent with the capability of in-situ grouting or stabilization of soil in treating the volatile organic compounds.

Semivolatile organic compounds are also potential contaminants of concern at the waste management units. It is not clear from this section whether Alternative 2 would reduce the leachability of semivolatile organic compounds. This discrepancy should be addressed.

76. Section 7.4.6, page 7-13, lines 9 to 26

Alternative 5, "Excavation, Above-Ground Treatment, and Geologic Disposal of Soil with Transuranic Radionuclides," considers excavating contaminated soils, separating transuranic from nontransuranic soils, backfilling the excavation with the nontransuranic soils, and treating and disposing transuranic soils. This alternative does not consider treatment of nonradioactive soil. The nonradioactive contaminants can potentially migrate and contaminate the groundwater. These issues should be considered before selection of the final alternative.

77. Section 7.4.7, page 7-13, lines 37 and 38

The rationale for treating the vented vapors by the catalytic incinerator to at least 95 percent destruction should be provided.

78. Section 7.5, page 7-14

The text in third bullet indicates that Alternative 3 (excavation and on-site treatment) may not be applicable to treat volatile organic compounds. However, it is reported in Section 7.4.4 that thermal desorption with off-gas treatment (an on-site treatment option) could be used if organic compounds are present. Many on-site treatment options such as vitrification; thermal desorption; and fixation, solidification, and stabilization retained for development of alternatives (Table 7-3) could be potentially used to treat both volatile and semivolatile compounds. The text should be changed to include volatile organic compounds in Alternative 3.

79. Table 7-1, pages 7T-1a and 7T-1b

Some information is either presented under inappropriate headings or the information is not consistent with the text in Section 7.0. Examples include with recommendations:

- The text in second and third bullets in the second column for soils and sediments should be moved to the third column.
- The general response actions for soils and sediments should be consistent with the text in Section 7.0.

- The text in first and second bullets in the second column for biota should be moved to the third column.

- The general response actions for biota should be the same as for soils and sediments as stated in Section 7.3.

- The text in the second bullet under the human health column for air should be moved to the third column.

- Tank waste and buried containers are included in this table, but not addressed in Section 7.0.

- The text for tank waste should be changed as follows:

  - no text under human health column

  - also include the text "prevent release to the environment"

  - also include "interim stabilization of tanks and ancillary piping and transfer facilities" in the general response actions column

- The text in the first column for buried containers should be moved to the third column.

- The general response actions for buried containers should include drum removal, disposal, and resurfacing in place of drum removal.

80. Table 7-2, pages 7T-2a to 7T-2c

The process option for landfill disposal should include on-site landfill and RCRA landfill in place of landfill disposal.

The process option for geologic repository is specifically proposed for transuranic contaminants. Hence, the text in the last column should be substituted with "T" (I, M, O, nontransuranic radionuclides if mixed with T) in place of "R" (I, M, O if mixed with R) for the process option geologic repository.

A footnote reading "T = Transuranic Contaminants Applicability" should be included at the bottom of the table.

81. Table 7-3, page 7T-3a to 7T-3j

The text "may not be effective for deep contamination" should be included under the column effectiveness for the process option grout curtains.

Off-gas treatment may be required for volatile compounds as well as for gaseous radionuclides (e.g., tritium generated during vitrification). Hence, the text under the column effectiveness should include gaseous radionuclides for off-gas treatment for the process-option vitrification.

For soil washing process option, the following text should be included:

- Effective with sandy soils. The process may work only for low level radiologically contaminated soils, under the column effectiveness.

- The process may not work for humus soil. The recycled water must be treated for radioactive and other contaminants.

The text is not clear under the column description whether contaminated soil or treated soil will be placed in an existing on-site landfill for the landfill disposal process option (page 7T-3f). The text in Section 7.0 indicates that treated soil will be placed in an on-site landfill. This inconsistency should be addressed and the text changed where appropriate. This comment is also applicable for the geologic repository process option in page 7T-3g.

Vapor extraction (page 7T-3h) is also ineffective for semivolatile compounds. Hence, semivolatile compounds should be included before inorganic compounds under the column effectiveness.

82. Table 7-4, pages 7T-4a to 7T-4d

The titles for alternatives should be consistent with the text in Section 7.0. For example, "In-situ Grouting/Stabilization" should be substituted for "In-situ Grouting," "Excavation, Treatment, and Disposal" should be substituted for "Excavation and Treatment."

Some applicable alternatives are omitted, and other nonapplicable alternatives are added. Examples are as follows:

- 216-Z-8 Settling Tank: The alternatives multimedia cover, in situ grouting and in situ vitrification may

not be applicable due to the nature of the tank. The tank is an aboveground carbon steel tank containing the wastes. The only alternative applicable to this tank is removal, treatment, and disposal.

- 216-Z-1 and 216-Z-2 Cribs: The cribs received organic wastes through the 241-Z-361 settling tank (Section 2.4.4.2, page 2-43). Hence, in-situ soil vapor extraction for volatile organic compounds should also be included as a preliminary remedial action alternative.

83. Section 8.1, page 8-2, first paragraph, lines 6 to 12

A bullet for evaluation of existing data (Section 8.1.3, page 8-5) should be inserted between the second and third bullets. The text for the third and fourth bullets, specifically the section numbers, should be corrected.

84. Section 8.1.4, page 8-7, first paragraph, line 38

The text incorrectly refers to Figure 4-5 when discussing the conceptual model. The correct figure number is 4-6.

85. Section 8.1.5, page 8-8

The specific objectives of the Z Plant AAMS listed in this section should be consistent with the objectives described in Section 1.3. The unlisted objectives should be included in this section, and parenthetical discussion sections should be provided for reference.

86. Section 8.2, page 8-10, first paragraph, line 18

A bullet for Section 8.2.2.6, which discusses data gaps, should be included.

87. Section 8.2.1, page 8-11, second paragraph, lines 10 and 11

The text references Superfund risk assessment guidance produced by EPA headquarters for human health risk assessment. EPA Region 10 risk assessment guidance (EPA 1991) for human health should also be referenced, as well as EPA guidance on ecological risk assessment (EPA 1989b,1989c).

88. Section 8.3.3.4, page 8-22

The conceptual model described in Section 4.2.1 notes the importance of recharge from precipitation as a potentially important driving force of contaminant migration to ground water and notes that the soil hydraulic properties and distribution coefficients also have an important influence controlling the migration rate to ground water. The available data described in Section 3.2.2 notes that the estimates of recharge at Hanford vary widely and that site-specific data to describe the soil hydraulic characteristics and distribution coefficients are in short supply. Estimates of recharge and measured soil hydraulic characteristics and distribution coefficients, as data types, are critical for determining the potential migration of contaminants to ground water, however, neither of these data types are specifically identified as data needs in Section 8.2.2 or as data gaps in Section 8.2.2.6, nor are they included in the data collection program described in Section 8.3.

The conceptual model also notes the potential importance that complexation with organics can have on the transport properties of inorganic ions. We do not see this issue addressed in Chapter 8.

89. Section 8.3.3.6, page 8-22, first paragraph, lines 33 to 37

The ecological investigation discussion should include a statement that the information obtained through ecological investigation activities will be used in the ecological risk assessment.

90. Section 8.3.3.6, page 8-22

Ecological investigation does not include activities to characterize biota. Methods for applying biota technologies for remediation (Table 7-3) to uncharacterized biota to meet Table 8-2 data needs should be explained.

91. Section 8.3.3.6, page 8-22, second paragraph, lines 39 to 42

This paragraph discusses the cultural resource investigation, but is presented under the section on the ecological investigation. The paragraph should be moved to the appropriate place in the AAMS.

92. Table 8-3, page 8T-3a and 8T-3b

The technology group for ex-situ treatment includes ion exchange, bioremediation, air stripping, encapsulation, incineration, volatilization, and ceramic forming. These technologies are either rejected or not considered during the screening of process options (Tables 7-2 and 7-3). Similarly for in-situ treatment, the technologies bioremediation, precipitation, flushing, chemical extraction, and aeration/air stripping are either rejected or not considered during the screening of process options (Tables 7-2 and 7-3). Also, cryogenic barriers and revegetation are either rejected or not considered for in-situ isolation/containment (Table 7-2, and 7-3). A rationale for determining the data needs for the rejected technologies should be provided.

93. Table 8-4, page 8T-4a to 8T-4e

A rationale for eliminating some of the radionuclides, metals, volatile and semivolatile organic compounds that are chemicals of potential concern for the Z Plant aggregate area (Table 4-15) from this comprehensive list of analytes should be explained.

94. Table 8-4, page 8T-4d

The Methods for Chemical Analysis of Water and Waste, (EPA 1983) 300 series method, is to be used for fluoride and nitrate/nitrite analysis in soil and water. The 300 series includes a number of methods for inorganic analyses. The specific method for fluoride and nitrate/nitrite analyses should be listed.

95. Table 8-4, page 8T-4e

Methyl isobutyl ketone (MIBK) is listed to be analyzed by SW-846 method 8240 (EPA 1986). Method 8015 is listed in SW-846 for the analysis of nonhalogenated volatile organic compounds and should be used for MIBK analyses.

96. Section 9.0, page 9-2, lines 21 to 26

The four unplanned releases that require no further remediation should be specified, or a reference section should be cited. Similarly, the two remedial investigations that are recommended for the liquid and solid waste disposal

units along with their corresponding unplanned releases should be specified, or a reference section should be cited.

97. Section 9.1, page 9-3

The rationale should be provided for using surface contamination greater than 2 mrem/hr for exposure rate, 100 count/min beta/gamma above background, alpha greater than 20 counts/min, or Environmental Protection Program ranking of greater than 7 to designate a site as an interim remedial measure (IRM) candidate.

98. Section 9.1.1, page 9-6, second paragraph, lines 9 to 20

The rationale for using 100 times the CERCLA reportable quantity or 100 times the most applicable standard for a particular constituent when determining whether a site warrants an expedited response action (ERA) should be provided.

99. Section 9.3.2, page 9-23

The text in the first bullet recommends removal of groundwater investigation from the scope of the Z Plant operable units. Conversely, groundwater investigation with the installation of perched zone monitoring wells at most of the waste management units is suggested in Table 8-7. This inconsistency should be addressed.

A table should be included clearly indicating the assigned waste management units and unplanned releases in the redefined operable units, including which sites deferred to other aggregate areas or programs.

100. Section 9.5, page 9-28

The text states that Section 7.3 contains an outline of treatability testing needs, however Section 7.3 contains no such summary. Treatability testing needs should be clearly identified and presented in this section for the technologies retained (Table 7-3) that are applicable to most waste management units. Treatability studies for technologies identified for on-site treatment are not discussed in this section and should be. Treatment technologies for soil-treatment by-products should be identified, and treatability studies should be proposed for these technologies.

101. Section 9.3.2, page 9-23 and 9-24

In regards to the recommendations; EPA prefers not to remove the groundwater investigations from the scope of the Z Plant Operable Unit Work Plans.

EPA agrees with the assessment to move the 232-Z facility to the Surplus Facility Program and the movement of the 216-Z-20 crib from the U Plant AMMS to the Z Plant AAMS.

As far as the other recommendations, EPA would like to discuss them at the comment resolution meeting.

102. Table 9-1, page 9T-1a to 9T-1c

The candidate sites recommended for evaluation and implementation under other AAMSs or programs such as RCRA and Hanford Surplus Facilities Program should be listed in this table under a separate column.

103. Section 10.0, page 10-4

References should be included for EPA (1989b,c; 1991) documents.

REFERENCES

DOE 1991. Hanford Site Baseline Risk Assessment Methodology. DOE/RL-91-45. Decisional Draft. September 1991. U.S. Department of Energy.

EPA 1983. Methods for Chemical Analysis of Water and Waste. U.S. Environmental Protection Agency. EPA-600/14-79-020.

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EPA 1989a. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002. December 1989. U.S. Environmental Protection Agency.

EPA 1989b. Risk Assessment Guidance for Superfund, Volume 2, Environmental Evaluation Manual. Interim Final. EPA/540/1-89/001. March 1989. U.S. Environmental Protection Agency.

EPA 1989c. Statement of Work for the RI/FS Environmental Evaluation for Superfund Sites. November 1989. U.S. Environmental Protection Agency, Region 10, Environmental Assessment Section.

EPA 1991. EPA Region 10 Supplemental Risk Assessment Guidance for Superfund. August 16, 1991. U.S. Environmental Protection Agency.

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